

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
1 July 2004 (01.07.2004)

PCT

(10) International Publication Number  
**WO 2004/055141 A3**

(51) International Patent Classification<sup>7</sup>: **A23L 3/34**, 3/35,  
A23K 1/16, C11B 5/00, A23D 9/00

(21) International Application Number:  
PCT/EP2003/050954

(22) International Filing Date: 8 December 2003 (08.12.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/434,715 18 December 2002 (18.12.2002) US

(71) Applicant (*for all designated States except US*): **CIBA  
SPECIALTY CHEMICALS HOLDING INC.** [CH/CH];  
Klybeckstrasse 141, CH-4057 Basel (CH).

(72) Inventors; and

(75) Inventors/Applicants (*for US only*): **SELTZER, Ray-  
mond** [US/US]; 11 Angus Lane, New City 10956-2539  
(US). **RAVICHANDRAN, Ramanathan** [US/US]; 1  
Caddy Lane, Suffern, NY 10901 (US).

(74) Common Representative: **CIBA SPECIALTY CHEM-  
ICALS HOLDING INC.**; Patent Department, Klybeck-  
strasse 141, CH-4057 Basel (CH).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU,  
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,  
CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE,  
GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR,  
KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK,  
MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT,  
RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR,  
TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (BW, GH,  
GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),  
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),  
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,  
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE,  
SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA,  
GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Published:**

- with international search report
- before the expiration of the time limit for amending the  
claims and to be republished in the event of receipt of  
amendments

(88) Date of publication of the international search report:  
9 December 2004

*For two-letter codes and other abbreviations, refer to the "Guid-  
ance Notes on Codes and Abbreviations" appearing at the begin-  
ning of each regular issue of the PCT Gazette.*

(54) Title: ANTIOXIDANT FOR FATS, OILS AND FOOD

(57) Abstract: A combination of one or more compounds selected from the group consisting of 3-arylbenzofuranones, long chain N,N-dialkylhydroxylamines, substituted hydroxylamines, nitrones, and amine oxides are highly effective antioxidants for use with edible organic substances subject to deterioration by oxidation.

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 03/50954

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A23L3/34 A23L3/35 A23K1/16 C11B5/00 A23D9/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A23L A23K C11B A23D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, FSTA, BIOSIS, CHEM ABS Data, COMPENDEX

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 346 630 B1 (ZINGG JUERG ET AL) 12 February 2002 (2002-02-12)  column 1, paragraph 5 - column 13, line 65 column 23, paragraph 2 column 26, paragraph 21-55	1-4, 14-17, 19,20
X	US 6 359 148 B1 (ZINGG JUERG ET AL) 19 March 2002 (2002-03-19)  column 1, paragraph 5 - column 13, line 53 column 23, paragraph 2 column 26, lines 16-50  ----- -/--	1-4, 14-17, 19,20

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

22 June 2004

Date of mailing of the international search report

15 OCT 2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Rooney, K

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 03/50954

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>NIISHIYAMA, T., SHIOTSU, S., AND TSUJITA, H.: "Antioxidative activity and active site of 1,3-indandiones with the beta-diketone moiety"  POLYMER DEGRADATION AND STABILITY,  vol. 76, June 2002 (2002-06), pages  435-439, XP002280823  GBBARKING  page 435, column 1, paragraph 1 - column  2, paragraph 3</p>	<p>1-4,  14-17,  19,20</p>
X	<p>-----  EP 0 867 467 A (GEN ELECTRIC)  30 September 1998 (1998-09-30)    page 10, lines 48,49  page 11, lines 11-14  -----</p>	<p>1-4,  14-17,  19,20</p>

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/EP 03/50954

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:  
1 (partially), 2-4, 14-17, 19, 20

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1(partially), 2-4,14-17,19,20

Use of 3-arylbenzofuranones as antioxidants in food compositions.

---

2. claims: 1(partially), 5-7, 14-20

Use of organic N,N-dialkylamines as antioxidants in food compositions.

---

3. claims: 1 (partially), 8, 14-20

Use of substituted hydroxylamines in foods compositions.

---

4. claims: 1 (partially), 9 , 14-20

Use of nitrones in food compositions

---

5. claims: 1 (partially) 10- 20

Use of amine oxides in food compositions.

---

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 03/50954

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6346630	B1	12-02-2002	CH 686306 A5 29-02-1996
		US 5955619 A 21-09-1999	
		US 5814692 A 29-09-1998	
		US 5773631 A 30-06-1998	
		AT 404941 B 25-03-1999	
		AT 176994 A 15-08-1998	
		BE 1008613 A4 04-06-1996	
		BR 9403589 A 16-05-1995	
		CA 2132131 A1 18-03-1995	
		CN 1106809 A ,B 16-08-1995	
		CN 1191229 A ,B 26-08-1998	
		CZ 9402263 A3 12-04-1995	
		DE 4432732 A1 23-03-1995	
		ES 2112140 A1 16-03-1998	
		FR 2710063 A1 24-03-1995	
		GB 2281910 A ,B 22-03-1995	
		HK 1005619 A1 15-01-1999	
		IT MI941891 A1 17-03-1995	
		JP 3023586 B2 21-03-2000	
		JP 7233160 A 05-09-1995	
		NL 9401507 A ,B, 18-04-1995	
		RU 2134689 C1 20-08-1999	
		SE 9403091 A 18-03-1995	
		SG 52428 A1 23-05-2000	
		SK 110594 A3 07-06-1995	
		US 5516920 A 14-05-1996	
US 6359148	B1	21-09-1999	CH 686306 A5 29-02-1996
		US 5814692 A 29-09-1998	
		US 5773631 A 30-06-1998	
		US 5955619 A 21-09-1999	
		US 6346630 B1 12-02-2002	
		AT 404941 B 25-03-1999	
		AT 176994 A 15-08-1998	
		BE 1008613 A4 04-06-1996	
		BR 9403589 A 16-05-1995	
		CA 2132131 A1 18-03-1995	
		CN 1106809 A ,B 16-08-1995	
		CN 1191229 A ,B 26-08-1998	
		CZ 9402263 A3 12-04-1995	
		DE 4432732 A1 23-03-1995	
		ES 2112140 A1 16-03-1998	
		FR 2710063 A1 24-03-1995	
		GB 2281910 A ,B 22-03-1995	
		HK 1005619 A1 15-01-1999	
		IT MI941891 A1 17-03-1995	
		JP 3023586 B2 21-03-2000	
		JP 7233160 A 05-09-1995	
		NL 9401507 A ,B, 18-04-1995	
		RU 2134689 C1 20-08-1999	
		SE 9403091 A 18-03-1995	
		SG 52428 A1 23-05-2000	
		SK 110594 A3 07-06-1995	
		US 5516920 A 14-05-1996	
EP 0867467	A	30-09-1998	US 5922794 A 13-07-1999
		CN 1195671 A 14-10-1998	
		EP 0867467 A1 30-09-1998	

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 03/50954

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0867467	A	ID 20099 A	01-10-1998
		JP 10338815 A	22-12-1998
		ZA 9802113 A	14-09-1998
-----			